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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/531,070

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Nalinkumar L Patel

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EXAMINER

LIN, JAMES

ART UNIT

PAPER NUMBER

1792

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,070	<b>Applicant(s)</b> PATEL ET AL.	
	<b>Examiner</b> Jimmy Lin	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/11/05, 7/3/06</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "wherein at least one of R and R'" in line 2. There is insufficient antecedent basis for this limitation in the claim. For the purpose of this examination, the claim will be interpreted as being dependent from claim 2.

Claim 12 recites the limitation "the first layer" in line 3. There is insufficient antecedent basis for this limitation in the claim. For the purpose of this examination, the first layer will be interpreted to be the polyfluorene layer.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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5. Claims 1, 4-9, 12 and 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz et al. (EP 1 178 546) in view of Lee et al. ("Improvement of EL efficiency in polymer light-emitting diodes by heat treatments"; hereinafter "Lee 1") and/or Lee et al. (The Effect of Different Heat Treatments on the Luminescence Efficiency on the Luminescence Efficiency of Polymer Light-Emitting Diodes"; hereinafter "Lee 2").

Aziz discloses a method of making an organic light emitting device (abstract), comprising of a light emission region formed between an anode (i.e., a first electrode capable of injecting or accepting charge carriers of a first type) and a cathode (i.e., a second electrode capable of injecting or accepting charge carriers of a second type) [0007]. The light emitting region can comprise of an organic light emitting material such as a polyfluorene [0026]. A heat treatment can be carried out after formation of the second electrode [0085].

Aziz does not explicitly teach heating the polyfluorene before forming the second electrode. Aziz does teach that the layers of the light emission region can be formed by spin coating [0075]. Accordingly, Lee 1 teaches that it was well known to have baked a spin coated light emitting film prior to the formation of the second electrode at a temperature below glass transition temperature (paragraph bridging pg. 249-250). Lee 2 teaches that baking of the light emitting film prior to formation of the second electrode at a temperature below glass transition temperature is to completely remove the residual solvent (paragraph bridging the two columns of pg. 801). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have heated the polyfluorene film of Aziz immediately after spin coating and prior to the formation of the second electrode with a reasonable expectation of success. One would have been motivated to do so in order to have prevented any deterioration of the device due to residual solvent.

Claims 19-21: Aziz teaches that the light emitting region can comprise of an organic light emitting material such as a polyfluorene [0026].

Claims 4-5: Both the heat treatment steps are performed below the glass transition temperature.

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Claims 6,17-18,22-24: The method forms an electroluminescent device.

Claim 7: Aziz teaches that the first electrode can be an anode and that the second electrode can be a cathode [0025].

Claims 8-9: Aziz teaches that the cathode can have a work function between 2.5 eV and 4.0 eV and that it can comprise calcium [0077].

Claim 12: Aziz teaches that a hole transport layer (i.e., a layer of conductive organic material) can be formed between the anode and the polyfluorene [0029],[0071].

Claims 14-15: Aziz teaches that the light emitting portion can be a mixed layer of a hole transport material and an electron transport material [0035]-[0036].

Claim 16: Aziz teaches that the light emission region can emit light colors of red, green, or blue [0045].

6. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz '546 in view of Lee 1 and Lee 2 as applied to claim 1 above, and further in view of Towns et al (WO 01/62869).

Aziz teaches the use of a polyfluorene material in the light emission region, but does not explicitly teach that the polyfluorene comprises of the structure as claimed in claims 2 and 3. However, Towns teaches that an electroluminescent material comprising of the structure as claimed can be used in the light emitting layer (pg. 18). The polymer can provide solubility, processability, and good efficiency and lifetime in the device (last paragraph of pg. 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used the electroluminescent polymer material of Towns as the particular polyfluorene of Aziz with a reasonable expectation of success. One would have been motivated to do so in order to have provided the OLED device with good efficiency and lifetime.

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz '546 in view of Lee 1 and Lee 2 as applied to claim 1 above, and further in view of Hirai (U.S. Publication No. 2001/0028962).

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Aziz does not explicitly teach forming a metal fluoride dielectric layer between the polyfluorene and the cathode. However, Hirai teaches that it was well known in the OLED art (abstract) to have formed an electron injecting layer comprising of an insulating thin film between the light emitting layer and the negative electrode. The insulating film can be lithium fluoride (i.e., a metal fluoride) [0046]. The negative electrode of Hirai [0034] can be made of similar materials as the cathode of Aziz [0077]. Because Hirai teaches that such structures were well known in the OLED art, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed an electron injecting layer comprising of an insulating thin film between the light emission region and the cathode of Aziz with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness (MPEP 2144.07).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz '546 in view of Lee 1 and Lee 2 as applied to claim 12 above, and further in view of Roach et al. (U.S. Publication No. 2001/0055454).

Aziz does not explicitly teach that the hole transport material can be PEDT/PSS. However, Roach teaches that it was well known in the OLED art to have used PEDOT/PSS as a hole transport material [0039]. Because Roach teaches that such a material was operable as a hole transport material, it would have been obvious to one of ordinary skill in the art at the time of invention to have used PEDOT/PSS as the particular hole transport material in the hole transport layer of Aziz with a reasonable expectation of success.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is (571)272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jimmy Lin/  
Examiner, Art Unit 1792

/Timothy H Meeks/  
Supervisory Patent Examiner, Art Unit  
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